Spring 5-2014

Evaluation of Autism in Young Children

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B.A., Ohio State University, 2011

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science

Department of Communication Disorders and Sciences
in the Graduate School
Southern Illinois University Carbondale
May 2014

RESEARCH PAPER APPROVAL

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Graduate School
Southern Illinois University Carbondale
February 8, 2014

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Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder associated with genetic risk as defined in the *Diagnostic and Statistical Manual of Mental Disorders* published by the American Psychiatric Association (2013). The etiology of ASD is considered idiopathic in approximately 90% to 95% of cases (Boyd, Odom, Humphreys, & Sam, 2010). The current diagnostic criterion for ASD requires impairment in the following three areas: reciprocal social interaction, communication, and specific patterns of behavior, interests, or activities (Dumont-Mathieu & Fein, 2005). In 2006, the prevalence of ASD was 1 in every 110 children or 1% of the population. Additionally, children aged 8 years identified as autistic increased by 57% from 2002 to 2006 (Center for Disease Control and Prevention [CDC], 2009). Recently, the reported prevalence of ASD in the United States is 1 in 91 or 1.1% of the population (Boyd et al., 2010). The increase in individuals with ASD affects speech-language pathologists (SLPs) due to an SLP's focus on the specified deficit areas. Since ASD affects areas of language and social communication, many SLPs' caseloads have seen an increase of those on the autism spectrum. Additionally, since ASD is a disorder that affects individuals throughout their entire life, they will not be dismissed from speech and language services regularly. Individuals with ASD will need intervention from SLPs for an extensive amount of time (ASHA Leader, 2012).

The first step in helping individuals with ASD is identification. Identification of ASD is done through observation and diagnostic measures, along with a formal diagnosis for qualification of speech and language services (Shaw & Hatton, 2009). With valid diagnostic tools and early screening processes for evaluation of ASD, clinicians have a greater opportunity for identifying children with ASD in the first two years of life. Earlier screening may yield a diagnosis and subsequent intervention at an earlier age, allowing maximal time for therapy

services. Therefore, the earlier that high quality intervention begins in a child's life, the better the outcomes (Dumont-Mathieu & Fein, 2005). Speech-language pathologists must use efficient and effective screening tools, standardized diagnostic tests, and informal observation to formulate an official report of referral or diagnosis. These three parts of evaluation for ASD should be implemented and usable for the birth to three population, in order to ensure adequate and early identification, accurate reports, and a plan for early intervention.

SLPs play a critical role in screening, diagnosing, and enhancing the social communication development and quality of life of children, adolescents, and adults with ASD (American Speech-Language-Hearing Association [ASHA] 2006). The SLP assists in the screening and early detection of individuals at risk for ASD and makes referrals to experienced professionals for diagnosis and intervention services. Additionally, the SLPs who acquire and maintain the necessary knowledge and skills can diagnose ASD, typically as part of a diagnostic team or other multidisciplinary collaborations (ASHA, 2006). The process of ASD evaluation in young children should include appropriate screening, administration of diagnostic tools, and referrals to rule out other conditions and facilitate access to comprehensive services. SLPs can administer screening tools and diagnostic measurements if there is suspicion of ASD, as well as refer to physicians and other specialists (ASHA, 2006).

Screening for Autism in Young Children

There are several tools currently available to screen infants and toddlers for ASD. These developmental surveillances and screening assessments do not provide a diagnosis, but help determine if further assessment of the child is needed. Two methods used in developmental screenings are parental reports and completed checklists through observation by trained clinicians or physicians (Dumont-Mathieu & Fein, 2005). A recent investigation completed by

Yama, Freeman, Graves, Yuan, & Campbell (2012), looked at the Modified Checklist for Autism in Toddlers (M-CHAT) in screening for ASD. The M-CHAT should be used as a screening tool for autism in very young children. The results indicated that the M-CHAT is appropriate to administer to children aged 20–48 months and is successful in detecting early symptoms of ASD. Children of participants ranged in age from 20 to 67 months at the time of involvement in the childhood interview survey. Findings suggest that the M-CHAT should not be administered to children beyond the age of 48 months as results revealed that specific questions may not otherwise be age relevant. The study supports the applicability of administering the M-CHAT to children between the ages of 20–48 months for screening and research purposes (Yama et al., 2012). The instrument can be used to screen for signs of ASD and as a frame of reference for further evaluation (Yama et al., 2012). This investigation has clinical significance because it indicates an appropriate screening tool that can be used by SLPs to screen for symptoms and early identification of ASD. Additionally, it provides the clinician with information on the age groups that are appropriate and contraindicative for applying this screening tool.

Another ASD screening investigation by Gray, Tonge, Sweeney, & Einfeld (2008) looked at the Developmental Checklist-Early Screen (DSC-ES) as a measure for screening for autism in young children with developmental problems. The participants consisted of 207 children aged 20-51 months. Parents of the participants completed the DBC-ES prior to attending an official assessment for the diagnosis of ASD. The results indicated that the DBC-ES proved to have utility as a screening tool for ASD in young children. This study had good interrater agreement and internal consistency along with significant correlations with a clinician completed measure of autism symptomology. Additionally, the results demonstrated that children who received a diagnosis of ASD or Pervasive Developmental Disorder-Not Otherwise Specified

(PDD-NOS) scored significantly higher on the DBC-ES compared to those who did not receive a diagnosis of PDD (Gray et al., 2008). Thus, the DBC-ES is another effective screening interview that can aid in early identification of ASD since it was found that children with ASD scored higher on this screening than those without ASD. This investigation is clinically significant because it provides the SLP with another effective screening tool for assisting in the establishment of ASD in young children.

It is important to note that these screening tools do not take the place of specialized diagnostic assessments (Boyd et al., 2010). However, they are applicable screening tools for ASD and are acceptable for administration by the SLP. Furthermore, using the M-CHAT and DBC-ES as screening tools are within the SLP's scope of practice (ASHA, 2006). The SLP should use screening tools if there is suspicion of ASD, and refer a child who tests positive under these screening tools for a further and a more complete evaluation. These early screening methods are of clinical important because they provide the SLP with tools for screening of ASD in infants and toddlers; this allows for the process of diagnosis to be established as quickly and as early as possible (Johnson, Myers, & the Council on Children with Disabilities, 2007). It also reveals specific deficits and allows for assistance in intervention plans, regardless of an official diagnosis (Boyd et al., 2010). Using screening tools like the M-CHAT and DBC-ES allows for a comprehensive evaluation, which contributes to the most efficient and complete report of ASD in children age birth to three (Dumont-Mathieu & Fein, 2005; Gray et al., 2008).

Standardized Diagnostic Measures for Autism Spectrum Disorder

Diagnosis of ASD should be based in appropriate and validated diagnostic measures. The Autism Diagnostic Observation Schedule (ADOS) is considered the gold standard diagnostic instrument for diagnosing children with ASD. This is because of the research validating its identification of ASD, and for its frequent and available use in all settings. Recently, standard diagnostic criteria and assessment procedures for older children were adjusted for use with infants and toddlers. This was often considered problematic because those diagnostic indicators were based on more chronologically and developmentally advanced expressions of autism (Luyster et al., 2009). Despite the fact that the ADOS is a widely accepted diagnostic instrument, up until recently it had restricted utility with very young children (Boyd et al., 2010).

Luyster et al. (2009) explored modifying the ADOS in children under 30 months of age. The sample of participants in this study included 182 children between the ages of 12 and 30 months with "best estimate" diagnoses of ASD, non-specified developmental delay, or typical development. A "best estimate" clinical or research diagnosis is based on impressions of a clinical psychologist or advanced graduate student in psychology (Luyster et al., 2009). The ADOS-Toddler Module was administered to all participants and scored immediately after administration was complete. The results of this investigation indicated that the Toddler Module contributes a new module to the existing ADOS and permits the use of this standardized instrument with children less than 30 months of age. The final set of protocols and algorithm items were selected based on their ability to discriminate diagnostic groups. The traditional algorithm cutoffs approach yielded high sensitivity and specificity. The Toddler Module includes the following three core areas of observation: language and communication, reciprocal social interaction, and play and stereotyped/restricted behaviors or interests. The algorithm scores have

acceptable internal consistency and sufficient interrater and test-retest reliability. It is also indicated that this research validated the lower chronological age limit for the ADOS-Toddler Module as 15 months. As a result of this investigation, the ADOS-Toddler Module is a new, standardized module of the ADOS and is considered appropriate for children in the age range of 15-30 months (Luyster et al., 2009). SLPs should make this part of their evaluation of ASD because it is a formal diagnostic instrument that uses validated algorithms for successful identification of ASD (Luyster et al., 2009).

This investigation is clinically relevant because it informs the SLP of the different types of diagnostic evaluations for ASD based on age. Any ADOS module, including the ADOS and ADOS-Toddler Module, are acceptable assessments to be administered by SLPs. Furthermore, the Autism Diagnostic Interview-Revised (ADI-R) is a commonly used, standardized, instructor-based interview for parents or caregivers of individuals referred for a diagnosis of ASD. The ADI-R consists of 93 items in the following three domains of functioning: language/communication; reciprocal social interactions; and restricted, repetitive, and stereotyped behaviors and interests. Since research has grown regarding detection of ASD symptoms in the first two years of life, ADI-R diagnostic algorithms have been produced to be specific to toddlers and young preschoolers. Currently, there is a Toddler version of the ADI-R that can be administered to children under the age of four, although no diagnostic algorithm has been generated for this version (Kim & Lord, 2012b). Therefore, the ADI-R should only be used as a supplemental part of diagnosing ASD in very young children.

An investigation by Kim & Lord (2012b) created algorithms for items that overlapped between the toddler and standard versions of the ADI-R. The aim of this investigation was to propose the first set of diagnostic algorithms for toddlers and young preschool children. The

participants consisted of 695 children aged 12-27 months with a nonverbal age of at least 10 months; they included children with ASD, nonspectrum disorders, and typical development. In this investigation, either the toddler module or standard version of the ADI-R was administered to parents of participants depending on the age and developmental level of the child. Results of this investigation presented with the first algorithms developed on data obtained from toddlers and young preschoolers. The new algorithms offer theoretically updated and more valid ways of using caregiver reports in the diagnosis of young children with ASD. These new diagnostic algorithms can be used with children as young as 12 months of age with a lowest nonverbal developmental level of 10 months. These updated algorithms demonstrate improved validity with fewer items and substantial gains in specificity compared to the previously developed algorithms (Kim & Lord, 2012b).

An additional advantage to the new algorithm for toddlers is that it provides clinicians and researchers with several different options for the diagnostic classification of young children. For diagnostic purposes, *ranges of concern* are offered that exemplify the severity of autism symptoms. These *ranges of concern* are used to show where a child falls among severity and whether or not the child should be followed up with further assessment or entered into treatment. The three specific *ranges of concern* include *little-to-no*, *mild-moderate*, and *moderate-to-severe*. Additionally, the new algorithms suggest that children do not have to demonstrate restricted or repetitive behaviors (RRBs), as long as they score high enough on the other domains to surpass the cutoffs for ASD. This is an improvement because it may eliminate concern from previous studies that parents might not report RRBs in very young children. All of the domains, including the RRB domain, contributed to the diagnostic validity of the new algorithms (Kim & Lord, 2012b).

Therefore, this investigation extends the valid use of the ADI-R to toddlers and young preschoolers ranging from 12 to 47 months of age and down to the nonverbal mental age of 10 months. These new algorithms can be used for either the standard or toddler version of the ADI-R (Kim & Lord, 2012b). Although these new algorithms improve validity, they do not guarantee an accurate diagnosis when given alone, for children under the age of 4. The ADI-R is still a good and useful tool to use for evaluating ASD when used with other assessments. This investigation is clinically significant because it provides a useful instrument for supporting young children with ASD and their parents. It advances the clinician's understanding of ASD through quantifying autism symptom domains at individual and domain levels. This contributes to the reliable diagnosis of toddlers and young preschoolers with ASD. Clinicians can administer this instrument to young children with suspected ASD in order to refer or to give support for official diagnosis. In addition, it gives clinicians levels of severity of ASD, which allows for a more detailed and informative decision on diagnosis or referral and future intervention plans. Lastly, the new algorithms of the ADI-R allows for administration and decision-making based off either the standard or toddler version of the ADI-R. This gives clinicians with either version the opportunity to administer the ADI-R to parents of children with assumed ASD.

The ADOS is a validated measure for identification of ASD and the ADI-R is a valuable tool for providing further evidence and severity levels when used in conjunction with other measures (Kim & Lord, 2012b). The ADOS-Toddler and ADI-R are both valid diagnostic tools for ASD and administration of these tools is within the SLP's scope of practice (ASHA, 2006). Outcomes from these tools should be used as part of the evaluation process and be administered by SLPs to make an informed decision in referring for an official diagnosis or giving a diagnosis themselves.

Ensuring Accurate Diagnostic Decisions

The increasing need for early detection of ASD demands for accurate and well-rounded diagnostic conclusions in young children. With the new diagnostic algorithms for toddlers and young preschoolers from 12 to 47 months of age having been developed for the ADI-R, and the revised algorithms for the ADOS-Toddler module for children under 20 months of age being established, a combined use of the newly developed and revised diagnostic tools is proposed by Kim and Lord (2012a).

The investigation by Kim & Lord (2012a) focused on the validity of the combined use of the ADI-R and ADOS using the new and revised algorithms for toddlers as young as 12 months of age. It was suggested that classification of ASD in younger children is less stable than in older children (Boyd et al., 2010). Therefore, both the ADOS and ADI-R should be used so that clinicians and researchers use information from both instruments when making diagnoses (Kim & Lord, 2012a). The ADI-R includes developmental history and the caregiver's perceptions of the level of impairment with the frequency of behaviors. The ADOS provides a summary of the clinician's observations for the child's behaviors and social interactions. By using data from multiple sources (e.g., clinicians, caregivers, and teachers), it enhances accuracy for the diagnosis of ASD; the instruments provide overlapping but not identical information (Kim & Lord, 2012a).

The investigation by Kim and Lord (2012a) examines the combined use of the ADI-R and ADOS for children under age four using the new and revised algorithms. Participants included 604 children, aged 12-47 months. The majority of the participants, 435 children, had ASD, while the remaining children had nonspectrum disorders or typical development. The children that participated in this investigation were administered the revised version of the ADI-

R and the ADOS-T as well as the Vineland and other cognitive testing. The following conditions were considered during analysis of the results of this study: (a) meeting ADI-R criteria, (b) meeting ADOS criteria, (c) meeting either ADI-R or ADOS criteria when both were administered, and (d) meeting criteria for both the ADI-R and ADOS. Results indicated that well-balanced sensitivities and specificities above 80% were obtained for ASD diagnoses when using both diagnostic instruments. A substantial amount of children (70%) whose scores were in the little-to-no range of concern in the ADI-R fell in the same range in the ADOS-T, and 64% of children whose scores fell in the moderate-to-severe range in the ADI-R fell in the same range in the ADOS-T. The use of the ADI-R and ADOS-T together for diagnosis of ASD in young children better reflects accurate judgment than when either single instrument was used. In fact, the combination of the new and revised algorithms revealed high validity and increased value for diagnosis. Additionally, this investigation supports the effectiveness of incorporating perspectives from both caregivers and clinicians, especially when evaluating more complex cases (Kim & Lord, 2012a).

Therefore, the ADOS and ADI-R should both be used when evaluating for ASD in a child under four years old because it increases sensitivities and specificities. This helps providing for a more accurate diagnosis and report based on the evidence from this investigation. This investigation by Kim and Lord (2012a) indicates that it is more beneficial to use both measures when evaluating for ASD, as opposed to using each instrument alone. This is especially true for more complex cases of ASD. After screening procedures have confirmed a need for a formal evaluation, both the ADOS and ADI-R should be used to guarantee a successful and comprehensive diagnosis (Kim & Lord, 2012a). This investigation by Kim and Lord (2012a) is clinically significant because it provides SLPs with the knowledge that using both diagnostic

tools together is important for making appropriate diagnostic decisions. It suggests that the revised ADI-R and ADOS-T provide unique information independently, but when used together, diagnostic agreement is enhanced. SLPs should use both instruments when evaluating young children for ASD in order to ensure efficient referrals for an official diagnosis (Kim & Lord, 2012a).

Research by Gray, Tonge, & Sweeney (2008) examined the validity of the combined use of the ADOS and ADI-R for preschool children with developmental delay and compared this to a clinical diagnosis. Participants consisted of 209 children aged 20-55 months, who had various developmental delays. The study evaluated the diagnostic classifications used by formal assessment instruments to consensus of clinical diagnosis. The parents and children participated in three evaluations sessions for the ADOS and ADI-R before diagnoses were given to the participants. The diagnosis for ASD was made according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition criteria for Autistic Disorder based on the ADOS and ADI-R algorithms. Of the 209 children that participated in this investigation, 120 received a diagnosis of ASD. The group with ASD scored higher on all domains of the ADOS and ADI-R than the non-autism group. This is relevant because it demonstrates that the diagnosis is consistent with higher scores on both of these formal assessments. When compared to a clinical diagnosis of autism, the ADOS had high agreement with the clinical diagnosis and the ADI-R had a moderate agreement. Additionally, the ADI-R algorithm cutoffs resulted in good sensitivity, specificity when comparing results with an autism clinical diagnosis. The ADOS data resulted in sensitivity of .85, specificity of .89, overall correct classification rate of .87, PVP of .91, and PVN of .81 when compared with the consensus clinical diagnosis. When the ADOS and ADI-R were compared together, the assessments had a fair agreement with a clinical

diagnosis (Gray, Tonge, & Sweeney, 2008). This indicates a need to use both standardized instruments when evaluating a young child for ASD.

Overall, the results of the investigation conducted by Gray, Tonge, & Sweeney (2008) indicated that the domain scores for the ADOS and ADI-R were significantly higher in the young children who received a clinical diagnosis than those who did not. This informs clinicians about the need to evaluate using more than other standardized method. Therefore, that the best route for an ASD diagnosis is a formal evaluation consisting of screenings, standardized assessments, and observations (Johnson et al., 2007).

Qualitative Information through Observation

Imitation and Play

Identifying unique qualities of ASD through observation is a necessary and beneficial step in the evaluation process. This would allow the SLP to quickly scan for signs of ASD if specific tools were not readily available and to explain these indications to parents and caregivers. Additionally, qualitative information is useful for comprehensive diagnosis reports and for future intervention targets. Some qualities that are characterized in terms of ASD include the following: play skills, imitation, language patterns, and nonverbal communication (Maenner et al., 2013; Vanvuchelen et al., 2010). These qualities are unique in young children with ASD and are part of the ASD identification.

As study by Stone, Lemanek, Fishel, Fernandez, and Altemeier (1990) examined play behaviors and motor imitation skills in children with ASD and children with mental retardation and other communication disorders (hearing-impaired, language-impaired). The authors aimed to determine if these behaviors' and skills helped in distinguishing autism from other disabilities and impairments. Participants included 91 children between the ages of 3 and 6 years of age.

Play behaviors were examined through observations during free-play for eight minutes using various toys including wooden blocks, toy cars, a kaleidoscope, dolls and doll furniture, a tea set, and a toy television. The results of this study indicated that young children with ASD used fewer toys, spent less total time playing with toys, and less time playing appropriately with toys relative to children in all other groups. This indicates that these play behaviors are unique to young children with ASD. Additionally, Stone et al. (1990) examined imitation skills (eight tasks involved actions with objects and four tasks involved body movements alone) in all groups of children including the children with ASD. These tasks were presented without verbal instruction in order to ensure that imitation rather than receptive language was measured. Results presented information that reflected children with ASD performed significantly lower than those children in all other groups. Overall, this study revealed that young children with ASD have weak motor imitation and immature play skills and that these characteristics are relatively specific to autism (Stone et al., 1990).

The study by Stone et al. (1990) demonstrated that information regarding play behavior and imitation skills can be utilized to signify the presence of ASD and serve as an indicator for further evaluation and future intervention goals. The SLP can do an informal assessment and observe for these specific indicators and use it as a guide for more evaluation and therapy targets. In addition, this information can be transferred and conveyed in reports to other professionals and caregivers to explain ASD indicators. This is important because these skills can be seen at a young age without having to use specific tools or assessments. Therefore, observation of play and imitation skills should be included in the evaluation of ASD in young children.

An investigation by Vanvuchelen, Roeyers, and Weerdt (2011) examined imitation difficulties as a risk factor for ASD. The Preschool Imitation and Praxis Scale (PIPS) was used to

explore differences between imitation, language, motor age-equivalents, and nonverbal mental age to distinguish a diagnosis of ASD from non-spectrum developmental disorders. Participants included 86 preschoolers, age 1.9-4.5 years, with suspected autism. This study used the formal assessment, PIPS to investigate imitation; this assessment examines bodily (gestural and facial) and procedural imitation in children between 12 and 59 months of age. The results suggested that testing for ASD through a multivariable setting provided evidence of imitation deficits were dependent on mental capacity and fine motor problems (Vanvuchelen et al., 2011). This denotes that using a formal assessment tool for imitation findings is less helpful in diagnosing ASD when compared to informal observation of unique imitation patterns (Vanvuchelen et al., 2011). Therefore, it is more effective and efficient to use the observation method when evaluating for ASD.

Results emphasized the importance of identifying valuable information, saving time and resources, and using the least invasive assessment of skills in ASD diagnosis. When observing for patterns of imitation skills, observation of these skills is the best way to aid in diagnosis of ASD at an early age because of the identified advantages determined and previous knowledge pulled. This is suggested based on the evidence concluded by comparing articles involving imitation (Vanvuchelen et al., 2011). This proposal has plausible merit, but it can be regarded that more investigations be replicated for further support. However, observation is the best form of identifying imitation skills when looking at the aforementioned investigations.

Nonverbal Communication

An investigation conducted by Chiang, Soong, Lin, & Rogers (2008) examined nonverbal communication in young children with ASD, in order to consider these skills and determine trends in the ASD population. The subjects were 104 children and infants with a mean chronological age of 32.79 months. The participants included children with ASD other developmental delays, and typical development. Three types of nonverbal communication skills were tested: joint attention, requesting, and social interaction. These nonverbal communication skills were tested using early social communication scales (ESCS). The initiating joint attention behaviors included eye contact, alternating eye gaze, pointing, and showing or extending. Additionally, responding to proximal pointing and distal pointing were scored. The requesting category included the following behaviors: eye contact when object moved out of reach, reaching, giving, and pointing. Social interaction involved obtaining attention or physical contact from the tester and engaging in turn-taking activities. The results indicated that young children with ASD had distinctive nonverbal communication profiles when compared with all groups. Children with ASD had significantly fewer nonverbal communication then the children in the other groups. It as also found that children with ASD displayed significantly fewer proximal points and fewer requests. Overall, this investigation revealed that children with ASD displayed deficits in joint attention ability and deficit in terms of frequency of nonverbal communication. Both frequency and proportion of communicative acts exposed deficits on initiating joint attention and responding to social interaction. It can be concluded that these findings suggest a unique impairment of social engagement seen in early ASD (Chiang et al., 2008). These findings suggest that young children with ASD may have specific nonverbal communication patterns in addition to distinguishing play and imitation behaviors. This is important because nonverbal

communication is another easily observed trait that an SLP can use to help determine if a child appears to demonstrate ASD characteristics. In addition, nonverbal communication can be explained to caregivers and included in reports to provide additional evidence of ASD.

Early Language Patterns for Autism

A primary diagnostic criteria used for the diagnosis of ASD is the presence of a language delay or language impairment (Luyster et al., 2008). Examination of language patterns in young children with ASD is essential to the evaluation process. A recent study conducted by Volden et al. (2011) used the Preschool Language Scale, Fourth Edition (PLS-4) to consider syntactic and sematic language skills in preschool children recently diagnosed with ASD. The PLS-4 is a language test used to identify language deficits and disorders in children; it can be used for children between birth to 6 years, 11 months of age. Luyster et al. (2008) sought to identify early language patterns in children with ASD, as well as to determine if the PLS-4 was suitable for identifying language deficits in these children. The participants comprised of 294 newly diagnosed preschool children with ASD with a chronological age in the range of 2 years to 4 years, 11 months. Criteria involved a sole diagnosis of ASD, without other diagnosed disorders or disabilities. The results indicated that expressive communication, for children with ASD, was at an overall advantage to auditory comprehension when analyzing Total Language raw scores from the PLS-4. The study also looked at whether poorer language was associated with more severe ASD-linked symptoms. Results revealed that lower language scores were not necessarily associated with ASD qualities. Further analysis demonstrated that higher PLS-4 scores were related to nonverbal cognitive skill and that there was high correlation between these skills and language. Overall, this investigation suggests that the PLS-4 is a valid measure of early language for syntax and semantics in children with ASD (Volden et al., 2011).

Thus, it can be concluded that the PLS-4 may be used for children with ASD to gather a general index of early syntactic and semantic skills, but cannot provide specific language patterns for this population at this time. It can be assumed that expressive language is higher than receptive language for the ASD population in young children. The PLS-4 is a tool that can be used to identify the language impairment or delay, and accounts for general trends of language patterns in ASD (Volden et al., 2011). Accordingly, when examining language patterns in the ASD population, this standardized assessment measurement should not be the only determinant of language performance within this population.

Conclusion

The importance of early detection and identification has increased due to the rise in ASD diagnoses during recent years. Appropriate early intervention can be provided with the diagnosis of ASD at a young age. The diagnosis of ASD by an SLP is a process consisting of screening, evaluation with validated diagnostic instruments, observation of skills and behaviors, and referral to a physician for further assessment as needed. Screening tools use parent reports and checklists based on inspection by trained clinicians to survey young children with the suspicion of an ASD diagnosis. When screening results indicate a need for further evaluation, SLPs should administer validated instruments designed for diagnosis of ASD (Luyster et al., 2009). There are standard diagnostic criteria and assessment procedures that can be used with infants and toddlers to gain a diagnosis of ASD (Kim & Lord, 2012a). Additional application of screening and standardized assessment instruments involves gathering information or referral options. Observation of qualitative information is an equally important part of the evaluation process and should be utilized in conjunction with screenings and validated assessments. Various skills and behaviors in play, imitation, nonverbal communication, and language can be observed in natural settings

(Maenner et al, 2013; Vanvuchelen, 2010). It is important to recognize that information gained form observation is valuable to obtain.

The M-CHAT and DSC-ES provide the SLP with screening tools that are appropriate for administration screening for ASD in infants, toddlers, and young-preschoolers. These screening measures allow for the process of diagnosis to be established as early as possible. Both of these tools are within the SLP's scope of practice to use. The ADOS-Toddler Module and ADI-R provide the SLP with two validated, standardized diagnostic assessments that can be used with young children for ASD evaluation. There are several modules within both tests that can assist in diagnosing children with ASD. The ADI-R also gives clinicians levels of severity of ASD for a more detailed sharing of information. These diagnostic measures are appropriate for administration by an SLP. The SLP should refer to gain an official diagnosis if the presence of ASD is detected. It is clinically implicated that SLPs use the ADOS and ADI-R conjunctively for a more conclusive and enhanced diagnostic agreement when evaluating young children with ASD. Although there are validated assessment measures for play, imitation, nonverbal communication, and language patterns, it is more beneficial to clinicians, caregivers, and children to obverse these patterns and behaviors in the natural setting. This provides a more comprehensive look at the qualities associated with ASD and allows for future objectives and goals to be easily established. Screening tools, standardized assessments, and observation for qualitative information should all be part of the evaluation process.

Further research should identify additional observation and assessment approaches that could be used for detection of ASD in young children. This could be accomplishes for example by classifying the most prominent characteristics of ASD found in the ADOS and ADI-R., allowing for more specific traits associated with ASD. This procedure would allow clinicians to

evaluate in a more time-efficient manner and allow early intervention to take place at a younger age. Additionally, further research could compare the physician's clinical-based diagnosis and diagnosis through official screening and standardized diagnostic tools, in order to inform clinicians about which diagnosis is more efficient and effective.

Overall, ASD is a developmental disability that is distinguished by atypical development in socialization, communication, and behavior, usually identified before age three (CDC, 2009). The incidence and prevalence of ASD in children has greatly increased over the last 30 years and signifies an increase of intervention provided by SLPs (Diehl, 2003; ASHA Leader, 2013). With the increase of children with ASD, the best possible outcomes for these individuals is to use tools to screen, diagnose, and observe ASD and provide early intervention (Boyd et al, 2010.) While the SLP cannot diagnose ASD without the proper training, knowledge of the diagnostic process and ASD signs and symptoms is vital because communication and socialization deficits are necessary for diagnosis (Diehl, 2013.) Therefore, SLPs are an important part to the diagnosis of ASD and for implementing early and continued intervention for improving outcomes in children with ASD.

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Research Paper Title:
Evaluation of Autism and Young Children

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